Infrastructure Workshop
Hydropower R & D

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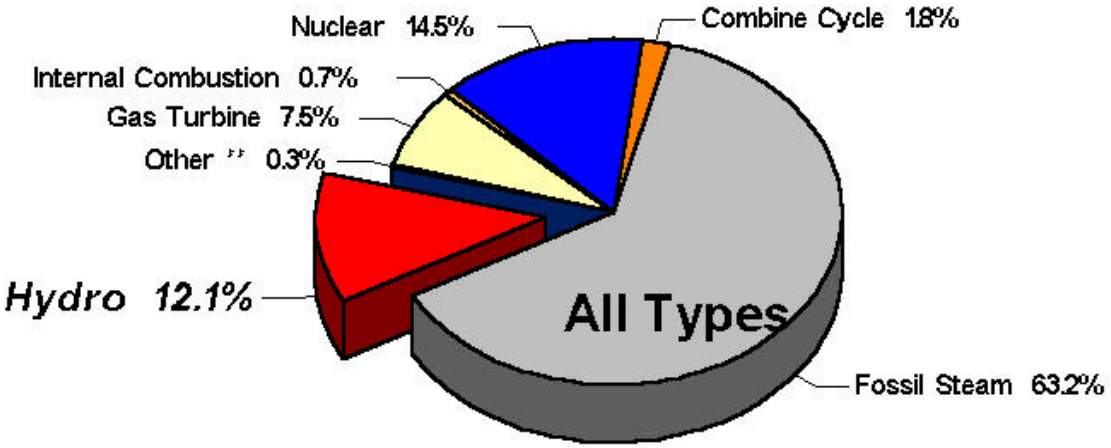
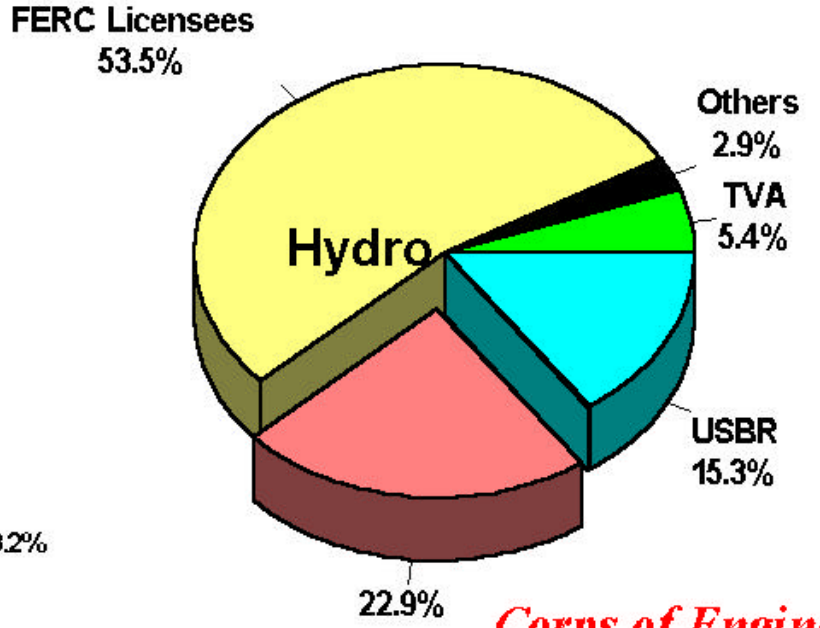
Corps' Hydropower Mission

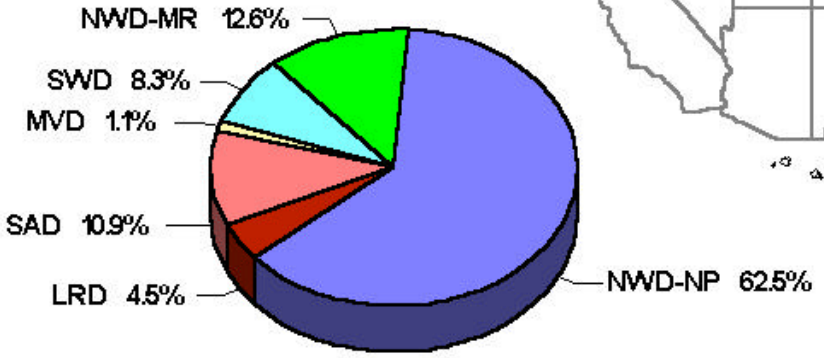
- Began in 1920's
- 75 powerhouses
- 21,000 MW installed capacity
- 349 main generating units

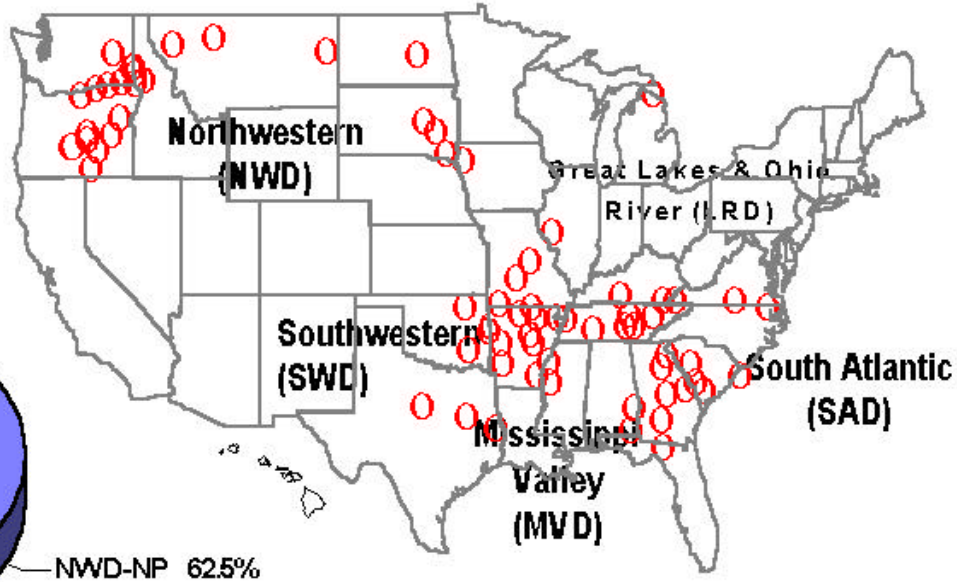
US Generation Capacities and Corps Projects





Corps of Engineers





Hydropower Investment

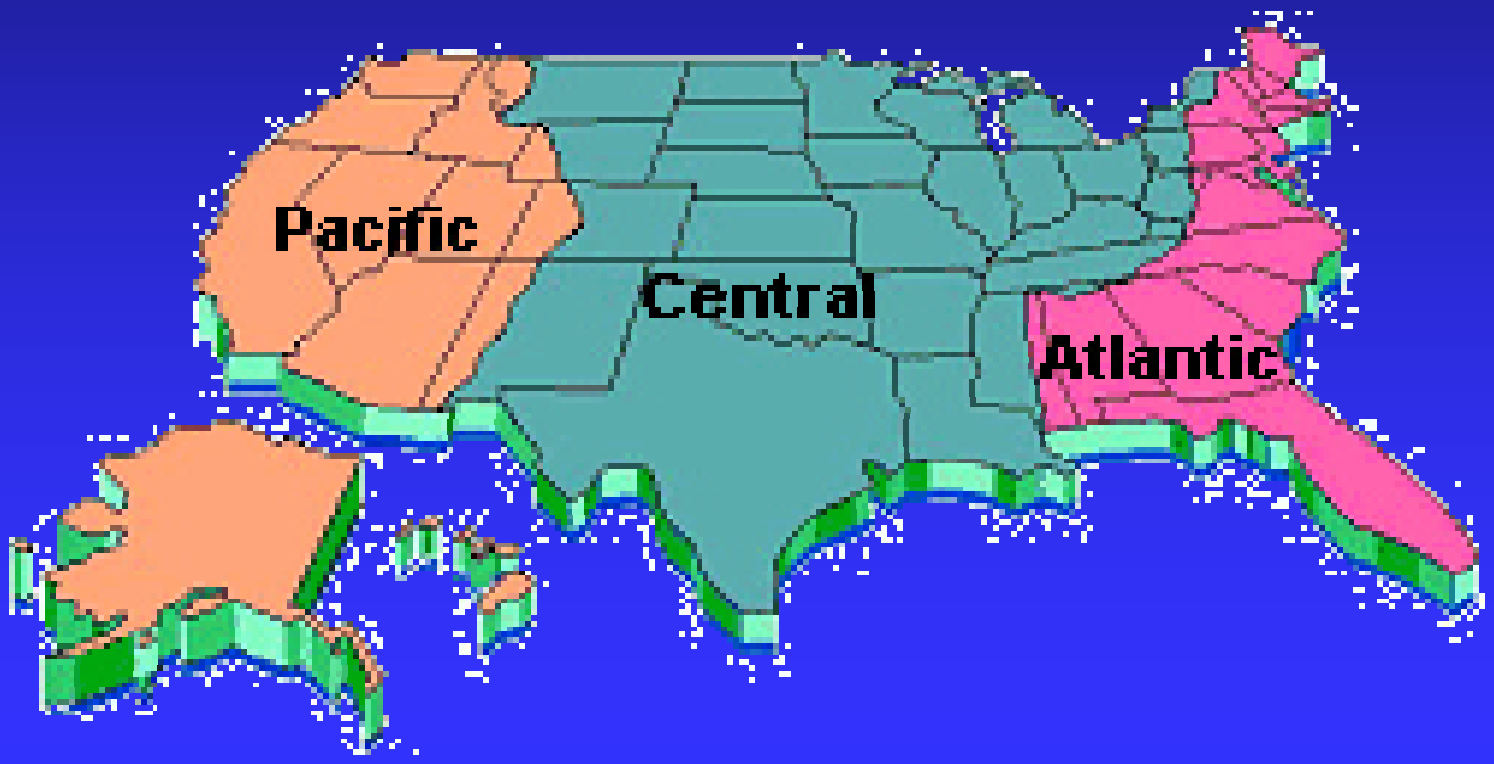
- Nearly $20 Billion
- Effectively 4th largest utility in the US
- Major player in hydropower business

Aging Infrastructure

- Average Project Age ~ 40 years
- Decreasing Reliability
- Increasing Forced Outages
- Maintenance Backlog
- Budget Constraints
  - O&M
  - Major Rehab

Hydroelectric Design Center

- Centralized design for hydropower
- Mostly mechanical and electrical engineers



Collaboration within USACE

- IWR - Project evaluation methods, Risk Analysis, Quadrant, etc
- CERL - Greaseless Bushings, Spray Metal Coatings for cavitation, Environmentally Friendly Lubricants, Condition Indicators
- WES – Fish Passage, Hydraulics

Collaboration with Hydropower Industry

- DOE - Hydropower R&D Summit
- HCI Publications & Hydro Research Foundation - R&D Forum
- Electrical Power Research Institute
- BC Hydro
- ASME
- IEEE

Hydropower Issues

- Restructuring of electric power industry
- Reliability of electrical system
- Local environmental issues
- Energy security - fuel sources and costs
- Global climate change
- Economy

Effects of Restructuring and Deregulation

- Industry turmoil and positioning
- Cost cutting
- Competition
- Public furor
- Lack of collaboration and cooperation
- Dramatic changes in operational priorities

Hydropower R&D Needs

- Project Evaluation Tools
  - Update Risk Analysis databases and tools
  - Finish Condition Indicators
  - Greenhouse Gas Reductions

Hydropower R&D Needs

- Environmental
  - Environmentally Friendly Lubricants
  - Greaseless Bushings
  - Fish Passage through Turbines
  - Enhancement of Dissolved Oxygen
  - Removal of Red Lead Paint

Hydropower R&D Needs

- Reliability and Operational Improvements
  - Shaft Stress Methodology
  - Absolute Flow Measurement
  - Unit and Plant Optimization

Hydropower R&D Summary

- Funding needed to finish existing projects
- Funding needed to collaborate with other Federal Agencies
- Hydropower R&D Forum